ENERGY AND COMFORT

Indoor Air Quality

Q-TRAK™
Indoor Air Quality Monitor
Model 7575

Operation and Service Manual

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CONTENTS

CHAPTER 1 UNPACKING AND PARTS IDENTIFICATION 1

CHAPTER 2 SETTING-UP 3
Supplying Power to the Model 7575 Q-TRAK IAQ Monitor 3
Installing the Batteries 3
DIP Switch Settings 3
Using the AC Adapter 4
Connecting IAQ or Ventilation Probes 4
Using Optional Telescoping Thermoanemometer Probes 5
Extending the Probe 5
Retracting the Probe 5
Thermocouple Ports 5
Connecting the Thermocouples 5
Connecting the Optional Bluetooth Portable Printer Device 6
Connecting to a Computer 6

CHAPTER 3 OPERATION 9
Keypad Functions 9
Common Terms 10
Menus 11
DISPLAY SETUP 11
SETTINGS 12
FLOW SET UP 13
VOC SETUP 14
ACTUAL/STANDARD SETUP 15
DATA LOGGING 16
Measurements 16
Log Mode/Log Settings 16
Choose Test 21
Name Test 22
View Data 23
View Stats 23
View Samples 24
Print Test 25
Delete Data 26
% Memory 27
ZERO CO 28
APPLICATIONS 28
CALIBRATION 29
DISCOVER BLUETOOTH 29
Printing Data Using the Portable Printer 30
TRAKPRO™ Data Analysis Software 30

CHAPTER 4 MAINTENANCE 31
Recalibration 31
Cases 31
Storage 31
CHAPTER 5 TROUBLESHOOTING 33
APPENDIX A SPECIFICATIONS 35
APPENDIX B OPTIONAL PLUG-IN PROBES 37

These Application Notes can be found under TSI's web site:
http://www.tsi.com

TSI-109	Converting Standard Velocity to Actual Velocity
TSI-124	Heat Flow Calculations
TSI-138	Percent Outdoor Air Calculation and Its Use
TSI-141	Turbulence Intensity Measurements
TSI-142	Draft Rate: A Determining Factor in the Quantification of Human Comfort
TSI-147	Photo-Ionization Detection (PID) Technology
TSI-150	Using Bluetooth® Communications

Chapter 1

Unpacking and Parts Identification

Carefully unpack the instrument and accessories from the shipping container. Check the individual parts against the list of components below. If anything is missing or damaged, notify TSI immediately.

1. Carrying case
2. Instrument (7575-X)
3. USB cable
4. TRAKPRO™ CD-ROM with data analysis software
5. AC adapter

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Chapter 2

Setting-up

Supplying Power to the Model 7575 Q-TRAK™ IAQ Monitor

The Model 7575 Q-TRAK Indoor Air Quality (IAQ) Monitor can be powered in one of two ways: four size AA batteries or the AC adapter.

Installing the Batteries

Insert four AA batteries as indicated by the diagram located on the inside of the battery compartment. The Model 7575 is designed to operate with either alkaline or NiMH rechargeable batteries. Battery life will be shorter if NiMH batteries are used. If NiMH batteries are used the DIP switch will need to be changed. Refer to the next section, DIP Switch Settings. Carbon-zinc batteries are not recommended because of the danger of battery acid leakage.

DIP Switch Settings

To access the DIP switch, remove the batteries from the battery compartment. On the inside of the battery compartment, there is a window with a single DIP switch (see figure below). The table below shows the functions for the switch.

Caution: Make certain that power is turned off before changing the DIP switch settings.

Switch	Function	Settings
1	NiMH	OFF: Alkaline Batteries ON: NiMH Rechargeable Batteries

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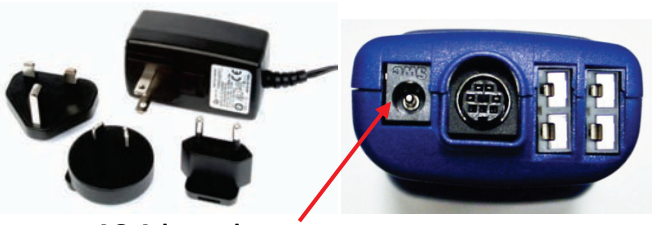
Do **not** attempt to charge alkaline batteries.

Using the AC Adapter

The AC adapter can be used to power the instrument or to charge the NiMH batteries when the DIP switch in the battery compartment is set to NiMH. If the DIP switch is set to Alkaline, and the AC power adapter is connected, then the batteries will be bypassed and the monitor will be powered by the AC adapter. Be sure to provide the correct voltage and frequency, which is marked on the back of the AC adapter.

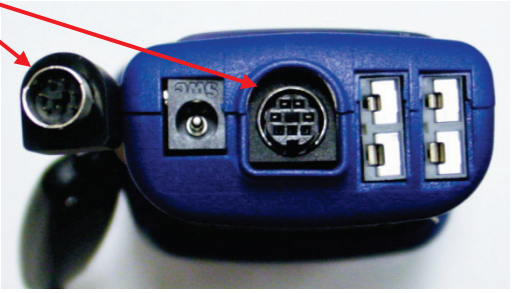


AC Adapter input

Connecting IAQ or Ventilation Probes

The ventilation and IAQ probes have a “D” shape overmolding on the mini-DIN connector which must align with the connector at the base of the 7575 monitor. This will ensure the probe is properly connected and remains so during use. Once connected and turned on, refer to the DISPLAY SETUP for displaying the desired measurements.

“D” Shaped
mini-DIN connector



Using Optional Telescoping Thermoanemometer Probes

The telescoping probe contains the velocity, temperature, and humidity sensors. When using the probe, make sure the sensor window is fully exposed and the orientation dimple is facing upstream.

NOTE: *For temperature and humidity measurements, make sure that at least 3 inches (7.5 cm) of the probe is in the flow to allow the temperature and humidity sensors to be in the air stream.*

Extending the Probe

To extend the probe, hold the handle in one hand while pulling on the probe tip with the other hand. Do ***not*** hold the cable while extending the probe as this prevents the robe from extending.

Retracting the Probe

To retract the probe, hold the handle in one hand while gently pulling the probe cable until the smallest antenna section is retracted.

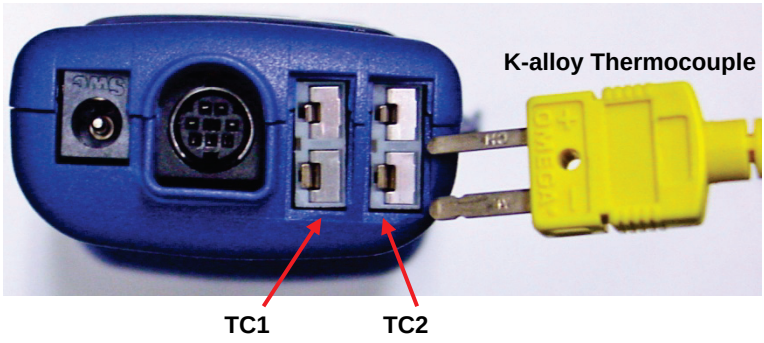
Do **not** use the instrument or probes near hazardous voltage sources since serious injury could result.

Thermocouple Ports

The 7575 series includes two thermocouple ports at the base of the monitor. Any K-Alloy thermocouple with mini-connector can be attached. See Display Setup for setting the thermocouple temperature readings to be displayed as TC1, TC2, or TC1-TC2.

Connecting the Thermocouples

The K-Alloy thermocouple with mini-connector has one terminal wider than the other. The wider terminal will be inserted into the bottom of the TC1 or TC2 connector port.



Thermocouples from an alternate TSI supplier must have the metal sheath electrically isolated from the wires inside. Failure to meet this requirement may result in false readings, electrical shock, or fire hazard.

Do **not** use the instrument or probes near hazardous voltage sources since serious injury could result.

Connecting the Optional Bluetooth® Portable Printer Device

To connect the Bluetooth printer to the Model 7575, power on the unit and the printer. Then press the MENU soft key. From the Menu use the ▲ and ▼ keys to highlight Discover Bluetooth and press the ↵ key. If other TSI Bluetooth-printers are in the area, turn them off before searching. The Model 7575 will then search for and list all available Bluetooth devices.

For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

Connecting to a Computer

Use the Computer Interface USB Cable provided with the Model 7575 to connect the instrument to a computer for downloading stored data or for remote polling. Connect the end labeled “COMPUTER” to the computer USB port and the other end to the data port of the Model 7575.

USB Communications Port

Bluetooth is a registered trademark of Bluetooth SIG.

Caution: This symbol is used to indicate that the data port of the Model 7575 is **not** intended for connection to a public telecommunications network. Connect the USB data port only to another USB port on a safety certified computing device.

Protection provided by the instrument could be impaired if used in a manner other than specified in this user manual.

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Chapter 3

Operation

Keypad Functions

ON/OFF ( ) Key	Press the ON/OFF key to turn the Model 7575 on and off. During the power up sequence the display will show the following: Model Number, Serial Number, and Software Revision. To turn the instrument off, press and ***hold*** the ON/OFF Key for 3 seconds. The instrument will count down (OFF2, OFF1, OFF). If AC Adapter is attached, the Battery and ON/OFF Key is bypassed. If the ON/OFF Key is pressed while the AC adapter is attached, the instrument instructs you to "Unplug the instrument to turn off unit". To turn the instrument on again, attach the AC adapter or press the ON/OFF Key.
Arrow (▲▼) Keys	Press to scroll through choices while setting a parameter. Pressing the ▲▼ keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments. To unlock the keypad, press the ▲▼ keys simultaneously.
Enter ( ) Key	Press to accept a menu selection, value or condition. Press to Start or Stop datalogging when in Continuous Key mode.

Arrow (⮜or ⮞) and Menu Soft Keys	Press arrow keys to change choices while setting a parameter. Press the Menu soft key to select the Menu selections, which are Pressure Zero, Display Setup, Settings, Flow Setup, VOC Setup, Actual/Std Setup, Data Logging, Zero CO, Applications, Calibration, and Discover Bluetooth.

Common Terms

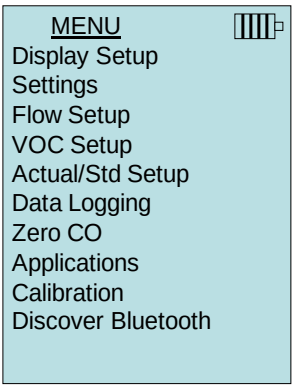
In this manual there are several terms that are used in different places. The following is a brief explanation of the meanings of those terms.

Sample	Consists of all of the measurement parameters stored at the same time.
Test ID	A group of samples. The statistics (average, minimum, maximum, and count) are calculated for each test ID. The maximum number of test IDs is 100.
Time Constant	The time constant is an averaging period. It is used to dampen the display. If you are experiencing fluctuating flows, a longer time constant will slow down those fluctuations. The display will update every second, but the displayed reading will be the average over the last time constant period. For example, if the time constant is 10 seconds, the display will update every second, but the displayed reading will be the average from the last 10 seconds. This is also referred to as a “moving average”.
Log Interval	The logging interval is the period over which the instrument will average the logged sample. For example, if the logging interval is set to 30 minutes, each sample will be the average over the previous 30 minutes.
Test Length	This is the time over which the data will be logged in the “Continuous-Time” mode of data logging.

Menus

The menu structure is organized to allow easy navigation and instrument setup utilizing the arrow keys and ↵ button. To exit a menu or menu item, press the ESC key.

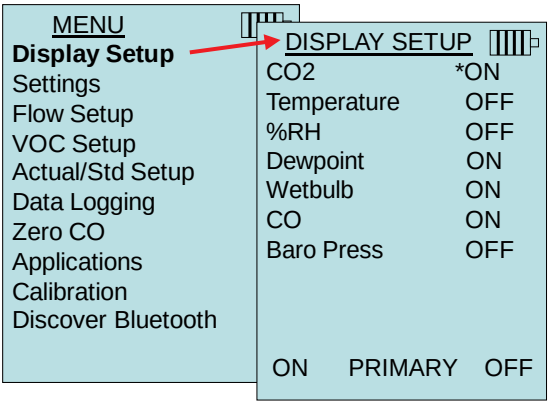
- To access the Menu items, press the Menu soft key.
- To select a parameter, use the Arrow keys to highlight the selection and press the ↵ button.



DISPLAY SETUP

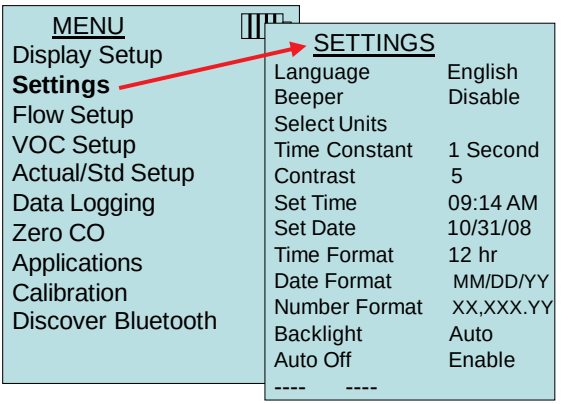
Display Setup menu is where you will setup the desired parameters to be displayed on the instrument screen. With a parameter highlighted you can then use the ON soft key to have it show up on the instrument screen or select the OFF soft key to turn off the parameter. Use PRIMARY soft key to have a parameter show up on the instrument screen in a larger display. A total of 5 parameters can be shown on the display, 1 primary (large font) and 4 secondary. Parameters shown in the Display Setup screen are dependent on the type of probe currently connected.

- When set to PRIMARY, measurement will be the large font on the display.
- When set to ON, measurement will be displayed as a secondary parameter (up to 4 can be displayed).
- When set to OFF, measurement will not be displayed.



SETTINGS

Settings menu is where you can set the general settings. These include Language, Beeper, Select Units, Time Constant, Contrast, Set Time, Set Date, Time Format, Date Format, Number Format, Backlight, Auto Off and Bluetooth PIN code. Use the ▲or ▼ keys to select an option, and the ◄ or ► soft keys to change the settings for each option. Press the ↵ key to accept settings.

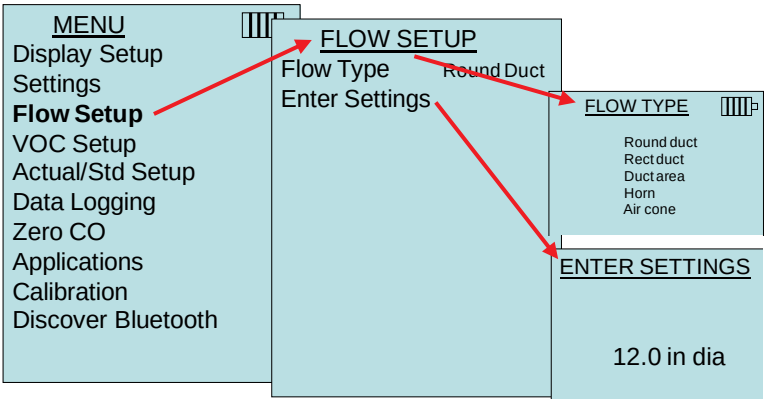


FLOW SET UP

In Flow Setup mode, there are five types: Round Duct, Rectangle Duct, and Horn. Use the ➤ or ➤ soft keys to scroll through the types and then press the ↵ key to accept the desired type. To change the value, highlight the Enter Settings option and press the ↵ key.

NOTES: *The horn numbers are the models of the horns. For example, 100 refers to a horn model number AM 100. Only horns with Model numbers as follows can be used with this function: AM 100, AM 300, AM 600 and AM 1200. If a horn model number is chosen, the instrument will return to measuring mode and use a preprogrammed curve to calculate flow rate from velocity when using a thermoanemometer probe.*

The air cone selection applies to the Model 995 Rotating Vane Anemometer and the Air Cone kit p/n 801749.

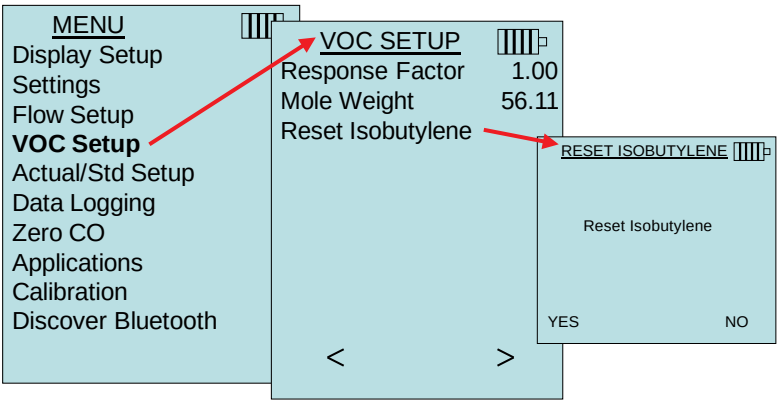


VOC SETUP

This menu item applies to TSI probes that measure Volatile Organic Compounds (VOC). The Response Factor and Molecular Weight of a specific gas can be inputted by the user.

- The response Factor is used to calculate the actual concentration of a specific VOC.
- The Molecular Weight of a specific gas allows for converting concentration (PPM or PPB) to mass concentration (mg/m^3).
- Reset Isobutylene will restore the factory to factory conditions for Isobutylene (56.11).

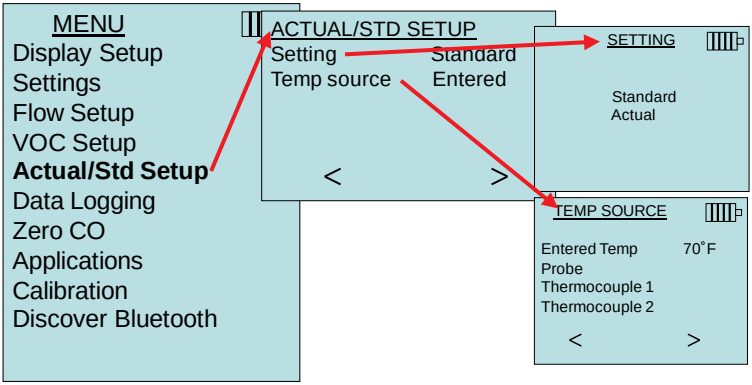
For more information, refer to Application Note TSI-147.



ACTUAL/STANDARD SETUP

Choose Actual/Standard measurements and parameters in the Act/Std Setup menu. The Model 7575 measures the actual barometric pressure using an internal sensor. The temperature source can be entered manually or taken from a probe that measures temperature (plug in probe or thermocouple).

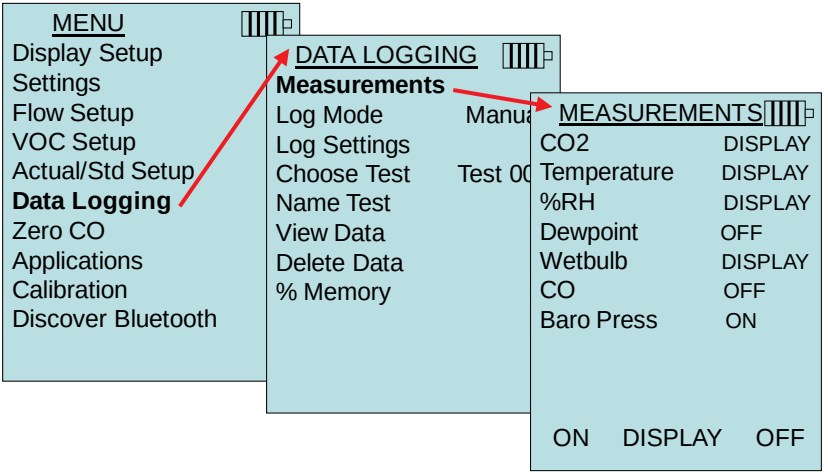
For more information on Actual and Standard conditions, refer to Application Note TSI-109.



Measurements

Measurements to be logged to memory are independent of measurements on the display, and must therefore be selected under DATA LOGGING → Measurements.

- When set to ON, measurement will be logged to memory.
- When set to DISPLAY, measurement will be logged to memory if it is visible on the main running screen.
- When set to OFF, measurement will not be logged to memory.



Log Mode/Log Settings

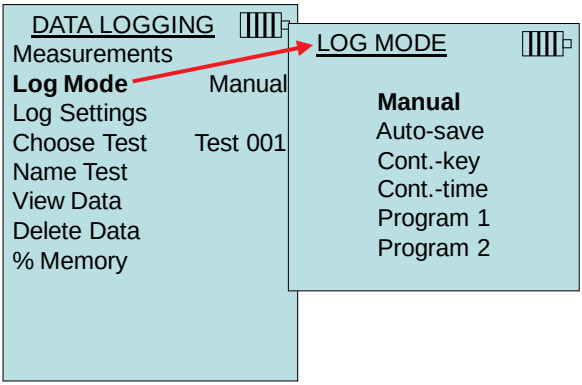
The 7575 can be programmed to store measurements to memory in several different logging formats:

- Manual
- Auto-save
- Cont-key
- Cont-time
- Program 1
- Program 2

Manual Logging

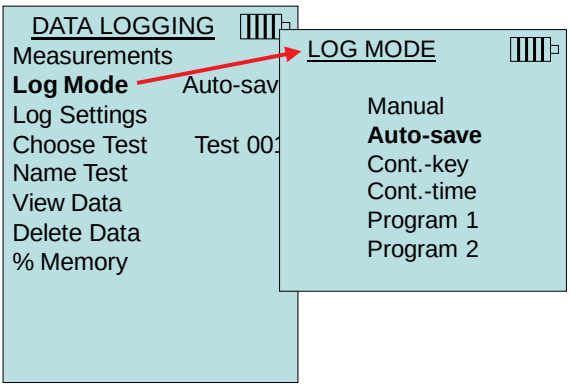
Manual mode does not automatically save data, but instead prompts the user to SAVE a sample or ESC to not save. To start logging, press the ↵ key.

***NOTE**: To adjust the averaging period for a sample, change the Time Constant (increase or decrease in seconds) which is located in the Settings Menu.*

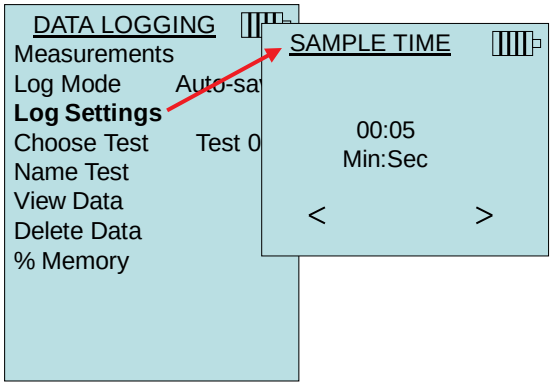


Auto Save Logging

In Auto-save mode, the user samples are automatically logged to memory at the end of the sampling period. To start logging, press the ↵ key.

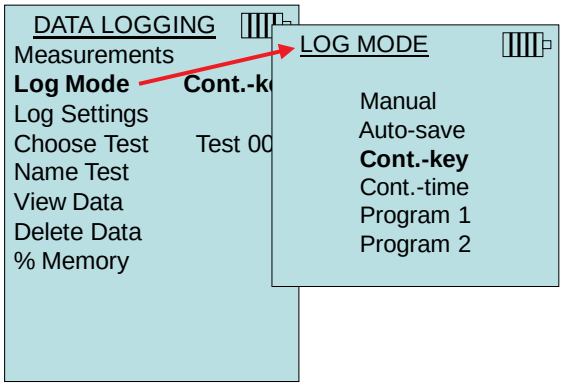


When set to Auto-save, the Sample Time can be adjusted. Sample Time is the time period over which the Sample will be averaged.

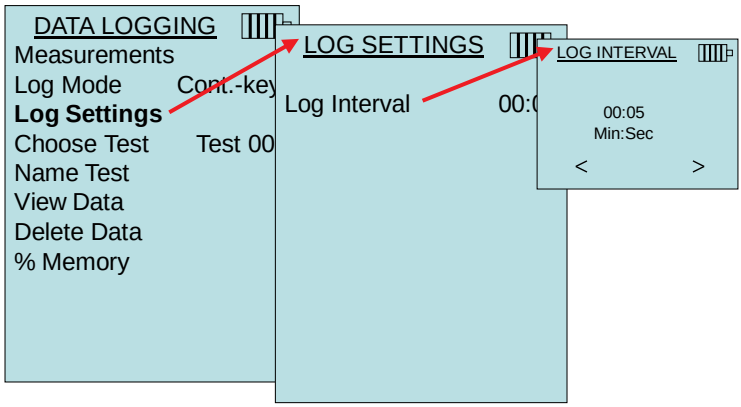


Cont-key Logging

In Cont-key mode, the user starts logging by pressing the ↵ key. The instrument will continue logging until the ↵ key is pressed again.



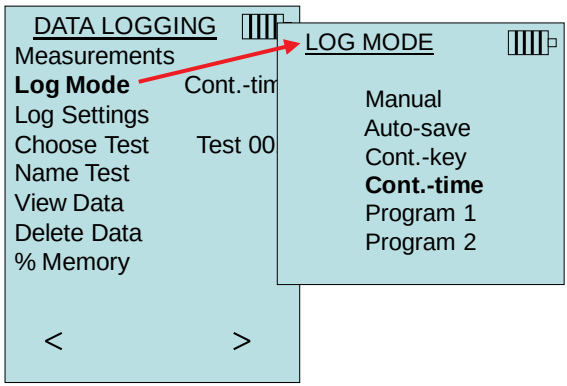
When set to Cont. key, the log interval can be adjusted.



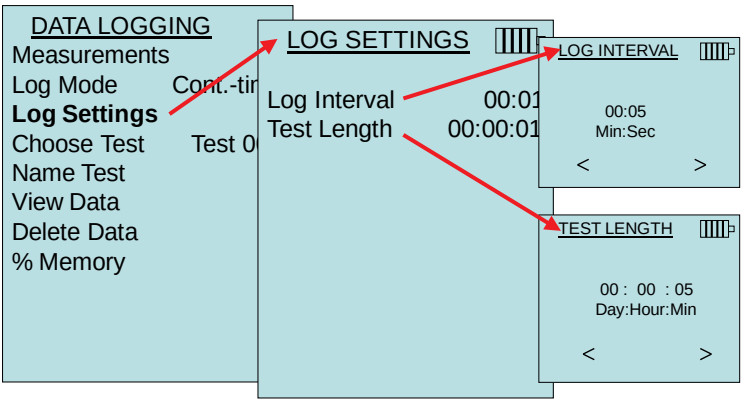
***NOTE**: Pressing the ▲▼keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments during unattended logging. A "Lock" symbol will appear on the display. To unlock the keypad, press the ▲▼keys simultaneously. The "Lock" symbol will disappear.*

Cont-time Logging

In Cont-time mode, the user starts taking readings by pressing the ↵ key. The instrument will continue taking samples until the time as set in "Test Length" has elapsed.



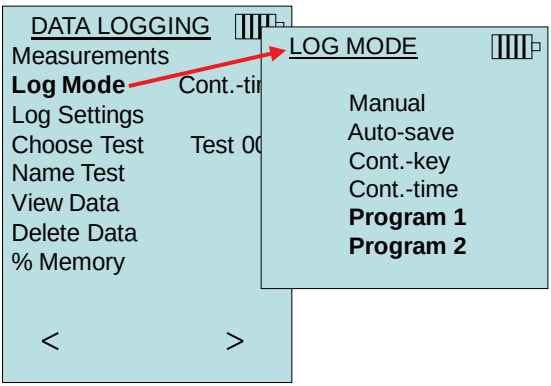
When set to Cont.-time, the log interval and test length can be adjusted.



***NOTE**: Pressing the ▲▼ keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments during unattended logging. A "Lock" symbol will appear on the display. To unlock the keypad, press the ▲▼ keys simultaneously. The "Lock" symbol will disappear.*

Program 1 and Program 2

Program 1 and Program 2 are customized data logging setup programs. Setting them up is performed using TSI's TRAKPRO™ Data Analysis software.



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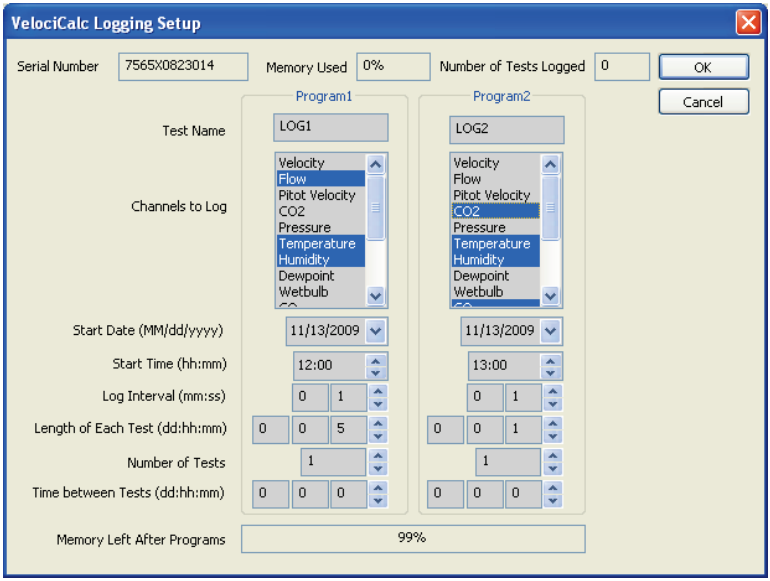
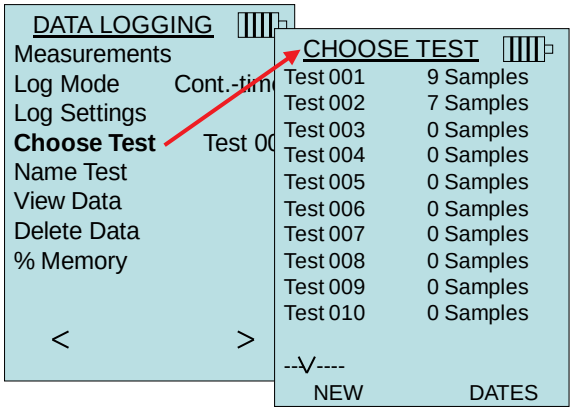


For more information, refer to the TRAKPRO Data Analysis Software User's Guide which can be found on the TRAKPRO software CD which is included with the 7575.

Choose Test

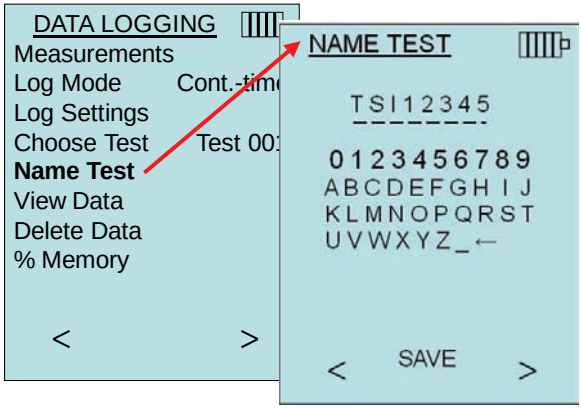
Test ID's consist of a group of Samples that are used to determine statistics (average, minimum, and maximum) of a measurement application**.** The 7575 can store 26,500+ samples and 100 test IDs (one sample can contain fourteen measurement types)**.** Example: Each duct traverse will have its own Test ID consisting of several Samples**.**

Pressing NEW will advance to the next available Test ID. Pressing DATES will list the date the Test was taken.



Name Test

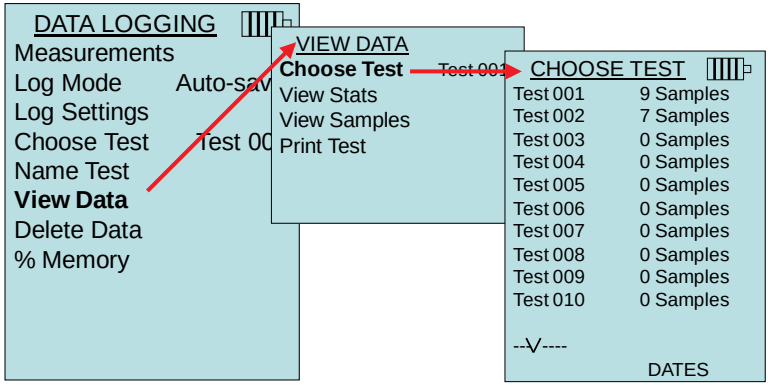
This option allows for customizing the Test ID name using 8 characters maximum. Use the arrow keys to move the cursor to a desired location, press ↵ to accept. Repeat until the desired name appears. Press SAVE to store custom ID name.



View Data

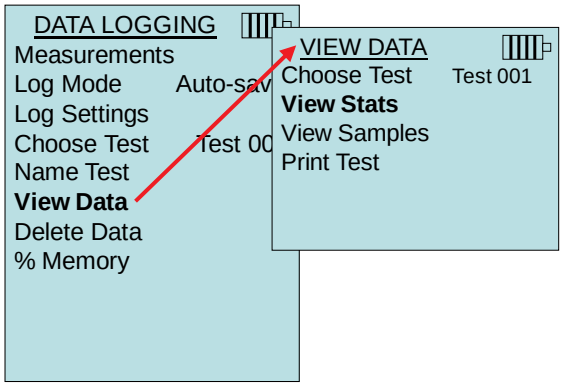
Choose Test

To view stored data, first select the Test ID that contains the data to be recalled. This is accomplished in the "Choose Test" menu.

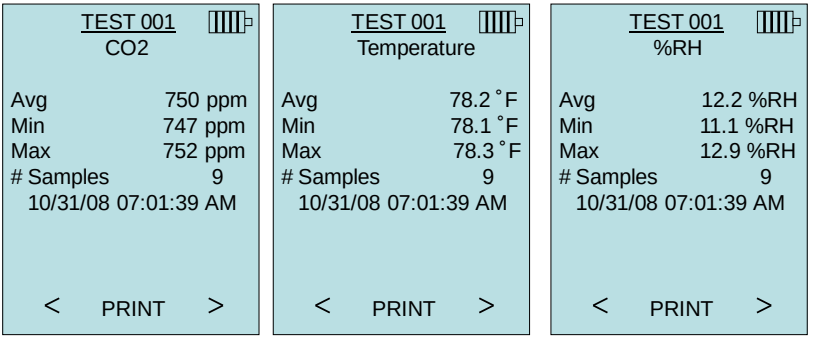


View Stats

Displays statistics (average, minimum, and maximum) of a selected Test ID and the number of samples, date and time the samples were taken.



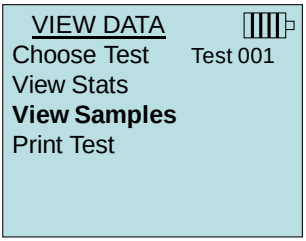
Use the ◄ and ► arrow keys to view statistics of all the measurement parameters stored in a Test ID.



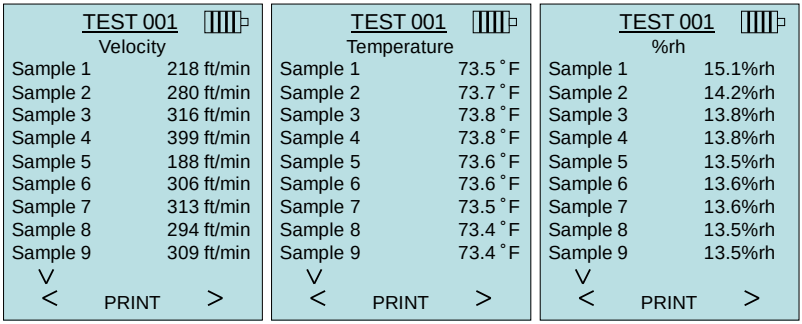
Example: TEST 001 has 9 samples, each sample consists of a pressure, temperature, and relative humidity reading. Use the < or > keys to view statistics of each measurement parameter.

The 7575 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the PRINT command, Bluetooth communications must be established between the 7575 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

View Samples



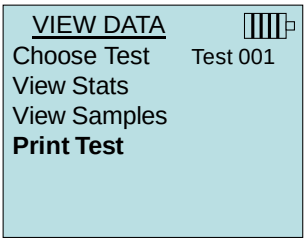
Use the ➤ and ➤ arrow keys to view samples of all the measurement parameters stored in a Test ID.



The 7575 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the PRINT command, Bluetooth communications must be established between the 7575 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

Print Test

Press ↵ to print all statistics and samples for the selected Test ID.

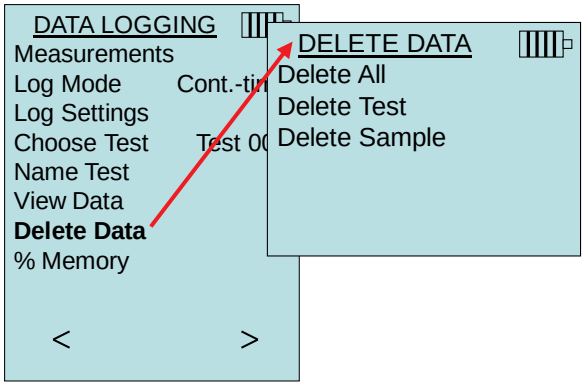


The 7575 can send this data to the optional Model 8934 wireless printer or PC capable of Bluetooth communications. To use the PRINT command, Bluetooth communications must be established between the 7575 and the Model 8934 wireless printer or PC set up with Bluetooth communications.

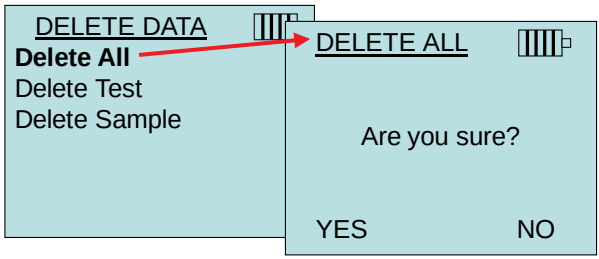
For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

Delete Data

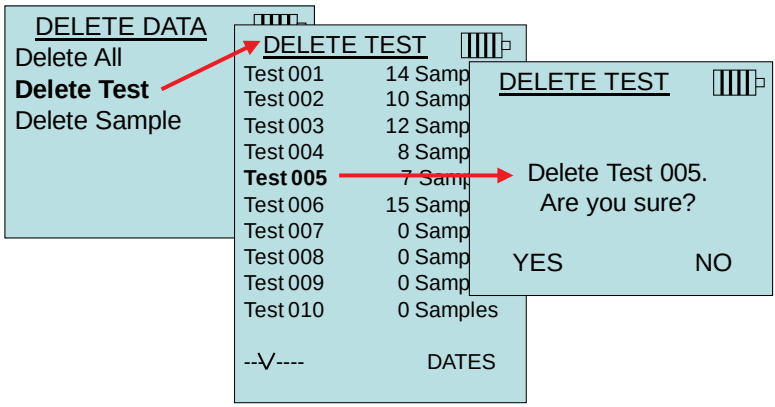
Use this to delete all data, delete test or delete sample.



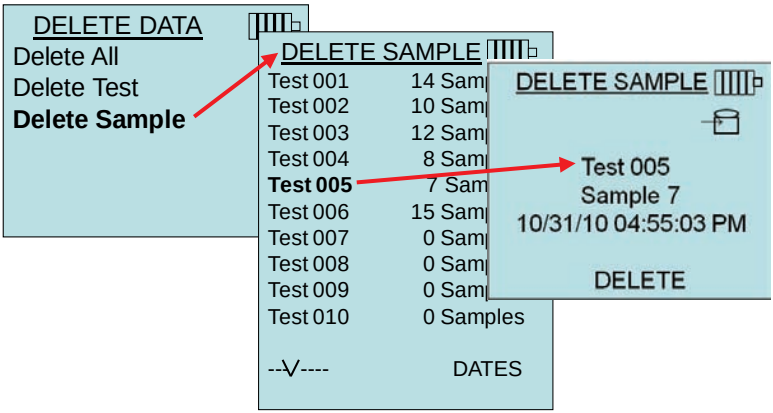
Delete All will clear stored data in all Test ID's.



Delete Test will clear stored data in an individual Test ID selected by the user.

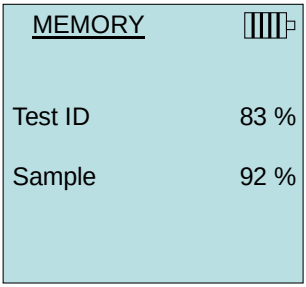


Delete Sample will clear the last sample in an individual Test ID selected by the user.



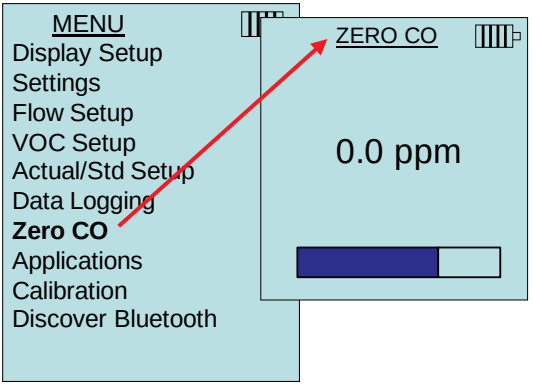
% Memory

This option displays the memory available. Delete All, under Delete Data, will clear memory and reset the memory available to 100%.



ZERO CO

This menu item applies to TSI probe Model 982 which can measure carbon monoxide (CO). Zero CO will zero the CO sensor readings that may have drifted. Initiating the Zero CO function will show the sensor CO reading and the time remaining.

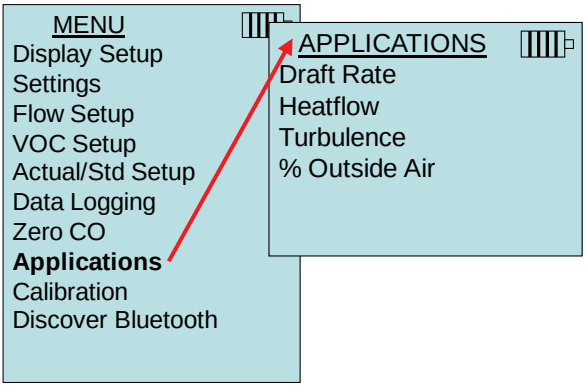


***NOTE**: The Zero CO function should be performed in an area where no combustion is taking place which may affect zeroing of the sensor.*

APPLICATIONS

This menu option includes specialized measurement protocols used to perform various tests or investigations. You can choose Draft Rate, Heat flow, Turbulence, and % Outside Air in the Applications menu. For more information on these applications, refer to the following information:

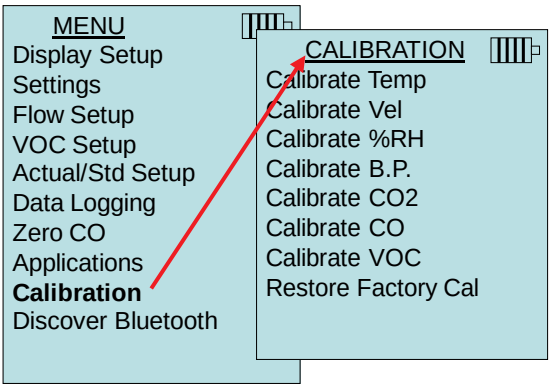
- Draft Rate: Application Note TSI-142
- Heat Flow: Application Note TSI-124
- Turbulence Intensity: Application Note TSI-141
- Percent Outside Air: Application Note TSI-138



CALIBRATION

The Calibration Menu lists measurement parameters that can be adjusted in the field. The appropriate detachable probes must be attached to the 7575 before field calibration can be undertaken except for pressure and barometric pressure calibration.

For more information on performing field calibrations, refer to TSI Applications Note TSI-146.



DISCOVER BLUETOOTH

The Q-TRAK monitor must “discover” the computer or printer before sending data.

This establishes the Bluetooth connection.

Select the menu option Discover Bluetooth and press ↵. The Q-TRAK screen will show “SEARCHING” while it searches for Bluetooth devices. A progress bar at the bottom of the screen will show if any devices are found.

The Q-TRAK monitor will search for up to six available Bluetooth devices. The screen will show how many devices were found and then try to get the common name of each device.

Select the desired device and press ↵. The screen will show "CONNECTING" and some messages showing connection progress will be shown.

After the connection is made, the Q-TRAK monitor will ask you to select "Printer" or "Computer" and press ↵.

For more information on establishing Bluetooth connections, refer to TSI Applications Note TSI-150.

Printing Data Using the Portable Printer

To print logged data, first enter the DATALOGGING menu. Then, use the CHOOSE TEST item to select the data to be printed. After the test is selected, use the VIEW STATS and VIEW SAMPLES items to select statistics or individual data points to view and print. After selecting VIEW STATS or VIEW SAMPLES, press the PRINT key to print the data.

TRAKPRO™ Data Analysis Software

The Q-TRAK Model 7575 comes with special software called TRAKPRO Data Analysis Software, which is designed to provide you with maximum flexibility and power.

Follow the instructions on the label of the TRAKPRO software to install the software on your computer. TRAKPRO software contains a very comprehensive Help Function. This utility provides all the necessary information to guide you in all aspects of software operation. The software is shipped on a CD-ROM. Updates are available from the TSI website at http://software.tsi.com.

To download data from the Model 7575, connect the supplied computer interface USB cable to the Model 7575 and to a computer USB port. Any USB port can be used.

Chapter 4

Maintenance

The Model 7575 requires very little maintenance to keep it performing well.

Recalibration

To maintain a high degree of accuracy in your measurements, we recommend that you return your Model 7575 to TSI for annual recalibration. Please contact one of TSI's offices or your local distributor to make service arrangements and to receive a Return Material Authorization (RMA) number. To fill out an online RMA form, visit TSI's website at http://service.tsi.com.

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The Model 7575 can also be recalibrated in the field using the CALIBRATION menu. These field adjustments are intended to make minor changes in calibration to match a user's calibration standards. The field adjustment is **NOT** intended as a complete calibration capability. For complete, multiple-point calibration and certification, the instrument must be returned to the factory.

Cases

If the instrument case or storage case needs cleaning, wipe it off with a soft cloth and isopropyl alcohol or a mild detergent. Never immerse the Model 7575. If the enclosure of the Model 7575 or the AC adapter becomes broken, it must be replaced immediately to prevent access to hazardous voltage.

Storage

Remove the batteries when storing the unit for more than one month to prevent damage due to battery leakage.

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Chapter 5

Troubleshooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the Model 7575. If your symptom is not listed, or if none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the Model 7575

Symptom	Possible Causes	Corrective Action
No Display	Unit not turned on	Switch unit on.
	Low or dead batteries	Replace batteries or plug in AC adapter.
	Dirty battery contacts	Clean the battery contacts.
Velocity reading fluctuates unstable	Fluctuating flow	Reposition probe in less turbulent flow or use longer time constant.
No response to keypad	Keypad locked out	Unlock keypad by pressing ▲▼ keys simultaneously.
Instrument Error message appears	Memory is full	Download data if desired, then DELETE ALL memory.
	Fault in instrument	Factory service required on instrument.
Probe Error message appears	Fault in probe	Factory service required on probe.
Probe is plugged in, but the instrument does not recognize it	Probe was plugged in when the instrument was ON	Turn instrument OFF and then turn it back ON.

WARNING!
Remove the probe from excessive temperature immediately: excessive heat can damage the sensor. Operating temperature limits can be found in Appendix A, Specifications.

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Appendix A

Specifications

Specifications are subject to change without notice.

CO_2:

Range:	0 to 5000 ppm
Accuracy[1]:	±3% of reading or ±50 ppm, whichever is greater
Resolution:	1 ppm
Sensor type:	Non-Dispersive Infrared (NDIR)

Temperature:

Range:	32 to 140°F (0 to 60°C)
Accuracy:	±1.0°F (±0.5°C)
Resolution:	0.1°F (0.1°C)
Response time:	30 seconds (90% of final value, air velocity at 400 ft/min [2 m/s])
Type:	Thermistor

Relative Humidity:

Range:	(0 to 95% RH
Accuracy[2]:	±3% RH (includes ±1% hysteresis.)
Resolution:	0.1% RH
Response time:	20 seconds (for 63% of final value)
Sensor type:	Thin-film capacitive

CO Sensor:

Range:	0 to 500 ppm
Accuracy:	±3% of reading or 3 ppm whichever is greater [add ±0.5%/°C (0.28%/°F) away from calibration temperature]
Resolution:	0.1 ppm
Response time:	<60 seconds to 90% of final value.
Sensor type:	Electro-chemical

Instrument Temperature Range:

Operating (Electronics):	40 to 113°F (5 to 45°C)
Storage:	-4 to 146°F (-20 to 60°C)

Instrument Operating Conditions:

Altitude up to 4000 meters
Relative humidity up to 80% RH, non-condensing
Pollution degree 1 in accordance with IEC 664
Transient over voltage category II

Data Storage Capabilities:

Range: Logs up to 56,035 data points with key (4) measured parameters enabled, 38.9 days at 1-minute log intervals

Logging Interval:

Intervals: 1 second to 1 hour (user selectable)

Time Constant:

Intervals: 1 sec, 5 sec, 10 sec, 20 sec, 30 sec, (user selectable)

External Meter Dimensions:

3.8 in. × 8.3 in. × 2.1 in. (9.7 cm × 21.1 cm × 5.3 cm)

Meter Probe Dimensions (Model 982):

Probe length: 7.0 in. (17.8 cm)
Probe diameter of tip: 0.75 in. (1.9 cm)

Meter Weight:

Weight with batteries: 0.8 lbs (0.36 kg)

Power Requirements:

Batteries: Four AA-size alkaline or rechargeable
or
AC adapter: 6 VDC nominal, 300 mA [Q-TRAK monitor mates with 5.5 mm OD × 2.1 mm ID plug, center pin positive(+)]

[1] At 77°F (25°C). Add uncertainty of ±0.2%/°F (±0.36%/°C) away from calibrated temperature.

[2] At 77°F (25°C). Add uncertainty of ±0.03% RH/°F (±0.05% RH/°C) away from calibrated temperature.

Appendix B

Optional Plug-in Probes

Thermoanemometer Probes	
Model	**Description**
960	Air Velocity and Temperature, Straight Probe
962	Air Velocity and Temperature, Articulating Probe
964	Air Velocity, Temperature, and Humidity, Straight Probe
966	Air Velocity, Temperature, and Humidity, Articulating Probe

Rotating Vane Anemometer Probes	
Model	**Description**
995	4 in. (100 mm) Rotating Vane, Air Velocity, and Temperature
496	1.5 in. (35mm) Rotating Vane, Air Velocity, and Temperature

Indoor Air Quality (IAQ) Probes	
Model	**Description**
980	Indoor Air Quality Probe, Temperature, Humidity, CO_2
982	Indoor Air Quality Probe, Temperature, Humidity, CO_2 and CO

Volatile Organic Compounds (VOC) Probes	
Model	**Description**
984	Low Concentration (ppb) VOC and Temperature
985	High Concentration (ppm) VOC and Temperature
986	Low Concentration (ppb) VOC, Temperature, CO_2, and Humidity
987	High Concentration (ppm) VOC, Temperature, CO_2, and Humidity

K-alloy Thermocouple Probes	
Model	**Description**
792	Surface Temperature Probe
794	Air Temperature Probe

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Contact your local TSI Distributor or visit our website www.tsi.com for more detailed specifications.

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